DOCUMENT RESUME

ED 140 925 JC 770 370

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TITLE Predicting Grade Point Average, Withdrawal and Graduation from Four Allied Health Programs at Miami-Dade Community College Medical Center Campus.
PUB DATE 77
NOTE 103p.; Ed.D. Dissertation, Nova University. Not available in hard copy due to marginal legibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Academic Achievement; *College Admission; Community Colleges; Competitive Selection; Dental Hygienists; Grade Point Average; Grades (Scholastic); *Graduation; *Health Occupations Education; *Junior Colleges; Medical Record Technicians; Medical Technologists; Predictive Validity; *Predictor Variables; Radiologic Technologists; Success Factors; Withdrawal

ABSTRACT

The validity of seven criteria utilized in conjunction with personal interviews and School and College Ability Test scores in the selection of applicants for admission to four Allied Health programs was investigated. The independent predictor variables studied were high school grade point average (GPA), the number of high school natural science courses taken, high school English grades, high school natural science grades, high school mathematics grades, percentile rank in high school, and Miami-Dade Community College GPA at the time of selection into one of the programs. Subjects included all 91 students admitted (out of 470 applicants) for the fall term, 1974: 28 Dental Hygiene students, 23 Medical Laboratory Technology students, 25 Medical Record Technology students, and 15 Radiologic Technology students. All those admitted were full-time students expected to have good potential for graduation within a two-year period. Dependent variables were final GPA, withdrawal and graduation from each of the programs. Only three significant correlations were found: Miami-Dade GPA at the time of selection for predicting final GPA in Dental Hygiene; high school grades in natural science for predicting graduation in Medical Laboratory Technology; and high school English grades in predicting graduation in Medical Laboratory Technology. (BB)

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PREDICTING GRADE POINT AVERAGE, WITHDRAWAL AND GRADUATION FROM FOUR ALLIED HEALTH PROGRAMS AT MIAMI-DADE COMMUNITY COLLEGE MEDICAL CENTER CAMPUS

BEST COPY AVAILABLE

ALAN M. BISTREICH

A MAJOR APPLIED RESEARCH PROJECT
PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF EDUCATION

NOVA UNIVERSITY
1977

JC 770 370

ACKNOWLEDGEMENTS

The writer wishes to express his sincere appreciation to each person who has contributed moral support, guidance and assistance in the preparation of his study. A special thanks to the project committee for their advice and counsel: Dr. Max Raines, Dr. John Losak and Dr. Leland Medsker.

The writer also wishes to extend appreciation to Dr. Elizabeth J. Lundgren and her administrative staff for their assistance and cooperation during the undertaking of this project.

To Mr. Bill Caei, Mrs. Robin Leach and Dr. John Scerba a gracious and very humble thank you for their considerable time and efforts in helping to complete this paper.

Finally, the writer expresses his sincere appreciation to his wife, Sheri, for her patience and understanding during the course of this program.

ABSTRACT OF A MAJOR APPLIED RESEARCH PROJECT PRESENTED
TO NOVA UNIVERSITY IN PARTIAL FULFILLMENT OF THE
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PREDICTING GRADE POINT AVERAGE, WITHDRAWAL AND GRADUATION FROM FOUR ALLIED HEALTH PROGRAMS AT MIAMI-DADE COMMUNITY COLLEGE MEDICAL CENTER CAMPUS

by

Alan M. Bistreich

June, 1977

The purpose of this research project was to assess the validity of the selection criteria of four Allied Health programs of the Medical Center Campus of Miami-Dade Community College, Miami, Florida. The independent predictor variables studied were: high school grade point average, the number of high school natural science courses taken, high school English grades, high school grades in natural science, high school grades in mathematics, the percentile rank in high school and the Miami-Dade Community College grade point average at time of selection into one of the four programs. The dependent variables researched were final grade point average, withdrawal and graduation from each of the programs.

The hypotheses employed to test the effectiveness of the four allied health selection predictor variables at the .05 probability level were as follows:

Hypothesis 1: High school grade point averages are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 2: The number of high school natural science courses taken is significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 3: High school English grades are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 4: High school grades in natural science are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 5: High school grades in mathematics are significant in predicting college grade point average, withdrawal and graduation from four allied health programs.

Hypothesis 6: The percentile rank earned in high school is significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 7: The Miami-Dade Community College prior selection grade point averages are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

The population studied was ninety-one entering students, Fall Term, 1974 for the four allied health programs: twenty-eight Dental Hygiene students, twenty-three Medical Laboratory Technicians, twenty-five Medical Records Technicians and fifteen Radiologic Technology students. The permanent record files of the ninety-

one students were individually researched to collect the data from the students' high school and college transcripts.

Multiple regression analysis, stepwise correlations, predictor equations and F tests were used to test the hypotheses of the study. The new Statistical Package for the Social Sciences (SPSS) catalog procedure as described in the SPSS supplement manual A-005-306, version 6.02 was used to obtain a computer program to calculate stepwise correlations, standard error, standard deviation, range and F values. Critical values of F were utilized to compute the level of significance of each independent variable to the dependent variables within each of the four allied health programs.

Within the four programs, the seven hypotheses were rejected in all instances except the following:

The Miami-Dade Community College Grade Point Average at time of selection proved significant at the .05 level for predicting the Dental Hygiene student's final college grade point average.

High School Grade earned in Natural Sciences proved to be significant at the .05 level in predicting graduation from the Medical Laboratory Technology program.

High School English grade earned also proved to be significant at the .05 level in predicting graduation from the Medical Laboratory Technology program.

The results of this study were presented to the Campus Vice President and the Campus Dean's Instructional Council (composed of the Deans of

Instruction in Nursing Education, Allied Health Technologies and Emergency and Critical Care Technologies) for review and discussion.

The results of this project support the recommendation that the above three predictor variables be used to supplement the current personal admissions interviews and test score results. The findings also support the recommendation that additional research studies be undertaken to:

Review the seven independent variables for the four Allied Health Programs for the entering class of the Fall Term 1975 and 1976.

Review other independent variables for validity as predictors of successful completion of Medical Center Campus Allied Health Programs. Suggestions were age, sex, natural science course grades in college, number of mathematics courses taken, SCAT, SAT and ACT test scores.

Study individual reasons given by students for withdrawal from the four allied health programs.

Review validity of personal admissions interviews.

Accomplish additional studies to study comparisons of groups of campus transfer students selected and high school graduates selected (new campus freshmen) for enrollment into an allied health program.

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CHAPTER I

INTRODUCTION

Background and Significance

The problem of "admissions squeeze" is a very familiar one to schools of the allied health professions. In the past decade, health-care related programs throughout the country have experienced the common problem of a large number of capable applicants competing for limited openings (Chaisson, 1976). High enrollment demands, limited instructional spaces, and the high cost of programs have forced many community colleges to place stringent admission requirements on the selection of students for certain allied health curricula such as Dental Hygiene, Medical Laboratory Technology, Nursing and Radiologic Technology (Hinkle, 1976). With recent research studies reporting withdrawal rates of 50 percent and higher for students entering community colleges (Astin, 1975), there is a necessity for efficient methods for choosing future allied health professionals.

The admissions selection process is a filtering system that is of general significance in deciding what society makes of its talent resources. It is the particular concern of a free society to provide the opportunity for each individual to develop fully his own capacities (Wing, 1971). It has been argued that each member of society ideally should be helped to concentrate his efforts upon the type of endeavor for which his talent is the greatest, thus making for maximum diversity in the activities pursued by different individuals (Wing, 1971). However, because of limited spaces available in health related educational programs, this cannot be

achieved. It is, therefore, apparent that admission predictors must be effective in identifying the talented and dedicated allied health applicant.

Selection filters comprised of college admissions criteria provide differential access to further educational opportunities. College and universities admissions practices influence the goals toward which pedagogy and curricula at earlier educational levels are aimed since earlier education inevitably molds itself in substantial degree toward maximizing the likelihood that students will receive the most favorable opportunities to obtain further educational advancement. Cognitive tests for selecting candidates for medical schools have proven to be effective in identifying the "smart, achievement-oriented, rather aloof individual who knows how to get good grades." (Korman, 1968)

The admissions process is basically an exclusionary rather than an inclusionary process as it concerns itself with separating the best applicants from the majority. But what disturbs many is whether the screening device keeps out the most dedicated individual while admitting the aggressive, science-oriented scholar (Chaisson, 1976).

Another element on the scene of the admissions process is the ever present watchful and threatening eye of the legal system. The greatest pressure source for change in the last three years has been the laws. Litigation by students directed at institutions where they are attempting to enroll is becoming increasingly common. What this means for schools and colleges facing the problem of selecting limited numbers of students from an oversupply, is that the age of subjective decisions has come to an end.

The precipitation of the legal issue in the admissions process has come about

largely as a result of the DeFunis vs Odegaard case in Washington (1974) which was eventually heard by the Supreme Court. This case was of major significance in relation to affirmative action efforts directed toward selecting minority students for medicine. The plaintiff, a nonminority University of Washington Law school applicant, alleged that minority students who were less qualified than he were admitted solely on the basis of race, thus constituting discrimination. The Supreme Court did not rule on the case, judging it moot, as the student had been admitted in 1971 by court order and was near graduation. Since that case, several similar suits have been filed in various parts of the country. These cases are being followed closely by admissions officers in institutions of higher education where selective admissions criteria are being utilized.

It is very apparant that where there is an abundance of applicants for a limited number of educational seats, it is important that the admissions selection system utilized be valid in assuring that qualified applicants will be accepted. The purpose of this study is to evaluate the admissions selection criteria as valid predictors of grade point average, withdrawal and graduation from the four allied health programs of the Medical Center Campus of Miami-Dade Community College, Miami, Florida. The Medical Center Campus has a greater number of individuals applying for admission than can be accepted, therefore, accurate evaluations of student potential must be made when selecting students for enrollment. In the Fall Term, 1976, Medical Center Campus applicants totaled 2,109 for 805 vacancies; 300 applied to Dental Hygiene for 27 positions, 62 applied to Medical Laboratory Technology for 45 seats, 44 applied for 24 Medical Records vacancies and 48 sent in applications for 22 seats in the Radiologic Technology program. It has been claimed that ninety percent of the 118 accepted or 106 people will graduate in the Summer Term, 1978. The same selection filters used for the class of 1976 were

also employed for the entering class of 1974, which was the population this project studied.

The Medical Center Campus of Miami-Dade Community College is the fourth and newest member of the multi-campus organizational structure of the College. The College began instruction in 1960 with an enrollment of 1,400 students. In 1965, the College was accredited by the Southern Association of Colleges and Schools.

The transition from a single campus to a multiple campus college occured in 1967 when a second major center, the South Campus, was established. In 1973, the Downtown Campus facility was completed. Construction on the Medical Center Campus began in March, 1975 and will be ready for occupancy in May, 1977. Presently, the campus is operating at an interim location on the Mt. Sinai Hospital grounds, Miami Beach, Florida at 4320 North Bay Road. (Miami-Dade Community College Catalog, 1976)

The Medical Center Campus is a speciality campus offering three, one year certificate programs and eleven, two year Associate in Science Degree programs. All of the programs are limited access curricula and have stipulated admissions criteria.

The objective of this study was to carefully review and evaluate those admission predictors of the four allied health programs (Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology). Success is defined for purposes of this study as graduation from each of the programs. The valid predictors that were identified were recommended for retention in future selection of allied health applicants. The non-valid predictors were presented to the Dean's Council, chaired by the Vice President of the Campus, and change was recommended.

STATEMENT OF THE PROBLEM

The problem of this research project was to determine if the currently used selections criteria of four Allied Health Technology programs of the Miami-Dade Community College Medical Center Campus, Miami, Florida, are valid indicators of predicting an applicant's successful completion of the program and to predict the individual's attainment of an Associate in Science degree. With increased demand for student seats in the allied health classes, limited clinical facilities and laboratory space and with the delicate balance of job opportunities in the allied health fields, it is evident that there is a need for valid screening devices in the selection of allied health students.

MAJOR ISSUES, RESEARCH QUESTIONS OR HYPOTHESIS

This project was a statistical analysis utilizing correlations and regressions of multiple variables. The dependent variables were grade point average, withdrawal and graduation from each of the four allied health programs. The independent variables were the predictors or admissions criteria: high school grade point average, number of high school natural science courses, high school English grade, high school grade in natural science, high school grade in mathematics, percentile rank in high school graduating class and Miami-Dade grade point average prior to selection. The hypothesis of this study was that the selections criteria are predictors of grade point average, withdrawal and graduation from Miami-Dade Community College Medical Center Campus.

The specific research questions of this study were:

1. What is the relationship between a high school grade point average and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

2. What is the relationship between the number of high school natural science courses taken and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

3. What is the relationship between the high school English grade and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

4. What is the relationship between the high school grades in natural science and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

5. What is the relationship between high school grade in mathematics and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

6. What is the relationship between the graduating percentile rank in high school and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

7. What is the relationship between Miami-Dade Community College grade point average prior to selection and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

BASIC ASSUMPTIONS

The basic assumptions of this research study were that the seven independent variables are currently being utilized as admissions selection criteria at the Miami-

Dade Community College Medical Center; that all applicants to the health-care career programs will be dedicated students during their two year tenure; that the graduates of each program meet the qualifications for taking the required National Certification or State Licensure examinations; and that the Medical Center Campus offers each accepted student adequate personal and learning skill counseling to minimize withdrawals from each of the programs.

LIMITATIONS

The research design of this study has inherent limitations. Multiple regression analysis has certain weaknesses such as the instability of regression coefficients. When a variable is added to a regression equation, all the regression coefficients change. In addition, regression coefficeients may change from sample to sample as a result of sampling fluctuations, especially when the independent variables are highly correlated. (Darlington, 1968).

Another problem in multiple regression analysis is, as Kerlinger states, (1973, page 77) "the addition of variables to the regression equation results in decreasing prediction payoff. If all the independent variables in regression analysis were correlated zero, this principle would not be valid. The only condition for prediction for any variable or variables would be for the independent variables to be substantially correlated with the dependent variable. Unfortunately, the reality is that independent variables are usually correlated. Consequently, interpretation of regression analysis data is often complex, difficult, even misleading."

The fact that the design is an ex-post-facto model is a limitation. The investigator does not have direct control of the independent variables because their manafestations have already occurred. The investigator cannot randomize and there is a risk of improper interpretation.

This study will only investigate four of the eleven health care programs offered at the Medical Center Campus culminating in an Associate in Science degree. No attempt is being made to study the other seven academic programs because of the differences in educational objectives. The other seven programs cross the three academic areas of the Campus: Allied Health Technologies, Emergency and Critical Care Technologies and Nursing Education. The researcher of this project chose to study programs under the direction of the Dean of Allied Health Technologies. The operational philosophy of the Allied Health Dean would prevail in these four programs.

One of the admissions criteria not included in this study is the Florida Twelfth Grade placement examination results. Effective Fall Term, 1976, this examination was no longer be given in the state of Florida. However, this examination was used as a predictor in the Fall, 1974, from which the population of this study was drawn. Another selecting criteria not used was School and College Ability Test results because the student record files were not available from the North Campus testing office. Another limiting factor of this study is that the researcher has no campus authority to change any of the admissions criteria that are found to be invalid as predictors of graduation. The researcher will have to present the results to the Campus Vice President and the Deans' Instructional Council for review, discussion and possible change.

DELIMITATIONS

To restrain from developing too global a study, this project did not study those factors which establish the limited enrollment of Medical Center Campus as different from the other "open door" campuses. The campus consists of three academic areas: Allied Health Technology, Emergency and Critical Care Technology and Nursing Education. Each area is headed by an academic dean with different management techniques, each area is concerned with different health care educational objectives, each area has different admissions selection criteria, and each area attracts different student populations. The campus stresses close faculty-student relationships and a shared nature of the learning process. All of the campus characteristics point toward a clearly defined educational career goal. The Medical Center Campus students are primarily behind-the-scene technicians: Dental Hygienists, Medical Records Technicians, Medical Laboratory Technicians and Radiologic Technicians; the Emergency and Critical Care Technology students are fire fighters, emergency rescue squad personnel, policemen and registered nurses (professionals already on-the-job in emergency related jobs); and the Nursing Education area students are science background, patient-care oriented students.

A study specifically aimed toward the differences among the multicampus structure of MiamiDade Community College would be an interesting project, however, this study is targeted at the specific selection screens of the limited enrollment campus within the "open door" community college district.

DEFINITION OF TERMS

Following are the definitions of terms with which the reader may not be familiar:

Admission: Admission to Miami-Dade Community College is open to: High School graduates, including those with state equivalency certificates; all others 18 years old or over; transfer students from colleges, universities, and other post-secondary institutions; foreign students with education equivalency to a United States secondary school education; other special categories.

Admission to Allied Health Programs: Students are advised not to interpret acceptance into Miami-Dade Community College as automatic eligibility to enter the Medical Center Campus programs. Each student who applies receives the specific eligibility requirements from each respective chairperson. Final selection for placement is determined by selection committees comprised of departmental chairpersons and faculty, student services administrators and Medical Center Campus students. Notification of placement will be provided each applicant.

Allied Health Student: A student accepted and enrolled into a Medical Center Campus generic program.

Associate in Science Degree: This degree is awarded to students who successfully complete one of the occupational Education/Careers or Allied Health programs. These areas of study are designed primarily to prepare students for immediate employment. The Associate in Science degree is awarded upon completion of an approved program of sixty or more academic credit hours in courses numbered 100-299. Students must earn a 2.0 grade point average or better in the sixty or more credits presented for graduation.

Campus Management Council: This is a participational management design consisting of the chief campus administrators. Currently the team consists of the Campus Vice President; Director for Campus Administration; Faculty Senate President; Student Congress President; Administrative Associate; Coordinator, Personnel and Budget Procedures; Dean of Instruction, Allied Health Technologies; Dean of Instruction, Emergency and Critical Care Technologies; Dean of Instruction, Nursing Education; Director, Student Services; and the Director, Facilities Management.

Dental Hygiene: This program prepares graduates to become practicing members of a dental health team dedicated to helping individuals maintain oral health and prevent dental diseases and disorders. It is a two year Associate in Science degree program. Students must pass a licensure examination to provide patient treatment.

Emergency and Critical Care Technologies: This area consists of Emergency Medical Technology programs (two one-term courses) for trained professional emergency personnel in Medical Technology (i.e., Firemen, Policemen) and Respiratory Therapy Technician and Technology programs. The technician is a one year (three term) certificate program that prepares the student to work as a respiratory therapy technician and the Technology program prepares the student to serve as a qualified respiratory therapist in a hospital or other health agency. Completion of both programs will qualify an individual to sit for a Certification Examination by the National Board for Respiratory Therapy.

Full-Time Student: One enrolled for twelve credits or more in a sixteen-week term or six credits or more in a six-week term.

Grade Point Average: Each letter grade of the College's grading system has a point value. A student determines the grade points for each course by multiplying the number of points his grade is worth times the number of credits the course carries. Thus a "B" (worth 3 points) in a 3 credit course is worth 9 grade points and an "A" (worth 4 points) in the same 3 credit course is worth 12 grade points. The grade point average is found by adding the total grade point values for all courses and dividing by the total number of credits attempted during the same period of time. Used in screening applicants for Medical Center Campus Allied Health programs.

Medical Laboratory Technology: This program seeks to fill a critical need on the health care delivery team by preparing the student to work under supervision in a hospital or private clinical laboratory. Satisfactory completion of the two year program confers upon the student the Associate in Science degree and eligibility for Florida State Licensure and Registry with the American Society of Clinical Pathology.

Medical Record Technology: This program provides the student with specialized skills in the management of medical records. Students who graduate are eligible to take the national examination given by the American Medical Record Association, whereupon the student will become an accredited Record Technician.

Nursing Education: Associate Degree Nursing is a two year program leading to an Associate in Science degree. Following satisfactory achievement on the state board examination, the graduate is licensed to practice as a registered nurse. Practical Nursing is a one-year certificate program that prepares a safe and effective practitioner for beginning levels of patient care. The curriculum prepares the graduate to write the State Board Examination.

Personal Admission Interview: A pre-selection requirement of certain Medical Center Campus programs to assess potential student's goals and objectives.

Radiologic Technology: This program provides a broad base of education and performance based clinical experience in all technical aspects of work as a Radiologic Technologist. The graduate is eligible to take the registry examination of the American Registry of Radiologic Technologists.

Transfer Student Transcript: The transcripts from a previously attended college or university become part of the official student permanent record upon completion of evaluation of credit courses. Credit may be granted only for courses in which grades of "D" or better have been earned. College courses completed more than ten years prior to the date of enrollment at Miami-Dade Community College may require validation by examination.

PROCEDURES AND METHODOLOGY

This research paper was an historical, statistical design using correlation and

multiple regression techniques to determine the success of the four allied health programs' admissions criteria in predicting grade point average, withdrawal and graduation from each. The statistical techniques utilized correlated the predictor variables (the independent); high school grade point average, number of high school natural science courses, high school English grade, high school grade in natural science, high school grade in mathematics, percentile rank in high school graduating class and Miami-Dade prior selection grade point average withthe dependent variables; grade point average, withdrawal and graduation from the four Allied Health programs. The admissions criteria results will be derived from individual applicants' transcripts located in their permanent record file. The population to be studied was the ninety one hundred accepted applicants to the four allied health programs who entered in the Fall Term, 1974, thereby allowing the researcher of this study to follow the progress of the students over a two year period to graduation, Summer Term, 1976. The data collected was shown to the Miami-Dade Community College North Campus Research Education Specialist who assisted the researcher of this project in obtaining correlation coefficients of variables, multiple regressions and predictor equations.

IMPLICATIONS AND SIGNIFICANCE

In recent years, the number of persons being trained as allied health workers in the United States has tripled, and even this spectacular growth rate has failed to keep pace with the rising demand (Hamburg, 1974). At the same time, new allied health specialists have been developed with increasingly complex and sophisticated technologies. These demands have rendered traditional on-the-job training inadequate, with the result that hundreds of academic programs for allied health

personnel have been organized in technical schools, community colleges and universities (Hamburg, 1974).

This increased demand for allied health technical studies has created a need for valid selection criteria in the admission of applicants to these limited enrollment programs. The selection filters employed are recognized as the screens that can pattern the profile of future allied health professionals. If the predictors being used are poor qualifiers for selecting dedicated and talented health-care individuals, the results could be devastating to the allied health fields.

Admission requirements are very influential and important to the development and utilization of our human talent resources. The detrimental selection devices result in poor product or, in this particular situation, poorly qualified health-care practitioners. The personnel of the Medical Center Campus of Miami-Dade Community College are quite conscious of the important product they are producing. Its selection filters are the primary basis for admitting health-care students. The graduate reflects on the initial practitioners entry selection criteria. If the criteria are invalid as predictors of graduation and grade point average, high attrition rates prevail, cost of instruction increases, teaching strategies and curriculum are erroneously studied and poor product results. It is significant that the Medical Center Campus develop and use valid predictors of success in selecting talent for its high demand, high cost and limited enrollment allied health technical programs.

SETTING

The Medical Center Campus is an innovative approach in a community college district for meeting the educational needs of students interested in health care curriculum programs. The campus is an attempt to unify the many allied health

disciplines under one administrative roof. The Medical Center Campus currently offers the following allied health programs:

1. Eleven Associate in Science Degree Programs (Two academic years):

   Dental Hygiene (Dental Hygienist)
   Electroencephalographic Technology
   Emergency and Critical Care Technology
   Medical Laboratory Technology
   Medical Records Technology
   Mental Health Technology
   Nursing Education
   Optometric Technician Sciences
   Physical Therapist Assistant Technology
   Radiologic Technology
   Respiratory Therapy Technology

2. The campus additionally offers three, one year planned certificate programs:

   Operating Room Technology
   Practical Nursing
   Respiratory Therapy Technology Assistant

3. The campus also offers four Special Service Programs (less than one academic year):

   Emergency Care for Emergency Room Nurses
   Emergency Medical Technology
   Operating Room Procedures for Graduating Registered Nurses
   Veterinary Assistant Service Courses

4. Also offered are Florida State Licensure Preparatory Programs:

   Continuing Education for Registered Nurses
   Nursing Home Administration

5. Seminars and Workshops

   The Campus co-sponsors a variety of seminars and workshops in specialized areas.

   Special Purpose Programs:

   a. In-agency part-time Practical Nursing Program.

      This program is administered by the Medical Center Campus within the large metropolitan county hospital for employed nursing assistants desirous of becoming practical nurses.

b. Licensure Practical Nursing to Registered Nurse Transition Program.

The transition program permits students who are licensed practical nurses to complete the program for the Associate in Science Degree in Nursing in one calendar year.

c. Preparation of Spanish Speaking Nurses for Florida Licensure.

The Medical Center Campus has been requested by the Florida Board of Nursing to prepare qualified Spanish-speaking nurses for the Board of Nursing Licensure Examination. This full-time program which the participant can complete in one year or less, depending on his/her qualifications, will accommodate approximately 300 nurses over the next four years who qualify under the Citizens Licensure Act of 1974.

d. One-Year Respiratory Therapy Technician Program.

This program, requested by community hospitals, qualifies the graduate to sit for a national certification examination and, subsequently, provides the opportunity for the graduate to enter the two-year Respiratory Therapy Technologist program with an advanced standing.

e. Associate Degree Nursing Course: Nursing Theory Laboratory I and II.

These courses provide the nursing student with the opportunity to seek additional assistance in completing the objectives of the nursing curriculum. The courses offer:

1) an appraisal of each student's needs and expectations resulting in a contractual agreement specifying the student's goals and objectives;

2) a reinforcement of the instruction in basic nursing principles and skills;

3) the provision of an accepting atmosphere which will facilitate the learning of students who are anxious and/or unsure about course responsibilities; and

4) referral of students to college support services.

f. Transitional Program: Physician's Assistant to Registered Nurse.

This program provides the Physician's Assistant with the opportunity to complete the program for the Associate in Science Degree in Nursing in a 16-week term. An intensive schedule of classroom discussion and clinical experience focuses on the nursing process. Students participate in selected experiences with generic nursing students. The graduate is eligible to take the Board of Nursing Licensure Examination.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Most allied health programs in the United States have a greater number of individuals applying for admission than can be accepted (Ballinger, 1976). Except for isolated regional instances of shortage of students, allied health programs throughout the country are oversubscribed and are feeling admissions pressures comparable to those of medical and dental schools. There are a number of plausible explanations for this state of affairs, but explanations are not solutions. The burden of selection of qualified students rests squarely on the schools (Hamburg, 1974). Heretofore, admissions criteria could be rather ill-defined, primarily subjective in nature, and only estimates of the applicant's potential. With increased pressure for schools to obtain equal access/equal opportunity, schools, today, must be able to document their decision-making in this critical area. Accurate evaluations must be made when selecting students for admission to allied health programs.

Within this chapter the issues are reviewed revolving around the dilemma of the admissions squeeze as it exists in the allied health educational institutions in the United States. The intent of the chapter is to provide the readers with a brief sketch of the historical development of the allied health field as it grew into the classification of occupational career choices. The chapter will also acquaint the readers with previous literature pertaining to the prediction of academic success in higher education.

Investigators of recent studies have found that the wealth of information available

on the prediction of academic success or acheivement is contracted by a relative void of information of the prediction of success within allied health (Angus, 1972). The review of these previous studies will serve two purposes: (1) to examine pertinent literature to determine what information researchers have derived relative to predicting success in allied health programs and other educational disciplines, and (2) to gain knowledge of the design of similar studies as well as the statistical analysis utilized in these studies. Additionally, this chapter discusses future trends which might assist in improving the admissions selection process.

HISTORICAL DEVELOPMENT OF ALLIED HEALTH

This past decade has witnessed the birth of a new academic administrative unit - the college of allied health professors (Hamburg, 1974). Beginning in the early sixties, when fewer than fifteen such entities could be identified, the number of allied health units has grown until today almost every major campus offers, under one title or another, a varied collection of allied health programs. As each of the categories in the allied health professions and services arose, almost always an evolutionary pattern occurred in which informal training of a bright, on-the-scene and available individual was replaced by an individual with more formalized on-the-job training. This occurrence was followed by the establishment of an organization of those who had been trained for the specific role, then by the promulgation of more formalized training requirements, usually accompanied by the formation of some form of professional registry; then by pressures for increasing standards of education and training; and usually by an eventual shift of the training site from a clinical setting to an educational institution. This was the natural historical cycle for the development of the allied health professions (McTernan, 1972).

Obviously, there were a number of reasons for the development of this new concept. Some of these were altruistic and in the public good, some selfish and in the interests of the members of the profesisonal or technical groups. Among the altruistic reasons was the fact that some standardization of education/training programs for health workers would help assure a certain minimal standard of competence. The evolutionary process, in leading to standardization, inevitably gave structure and increased status to the present groups and protected trainees in approved programs from being exploited (McTernan, 1972).

Allied health professions constitute a significant number of persons who perform a wide range of functions in the delivery of health services. Allied health, in the broadest use of the term, covers all professional, technical, and supportive workers in patient care, public health, and health research, as well as personnel engaged in environmental health activities. Allied Health workers in medical, dental and environmental health fields totaled about 925,000 in 1970, and when added to the more than 1.2 million nursing auxiliaries - licensed practical nurses, nurses aides, orderlies, and attendants - made up more than half of all the 3.9 million persons employed in health occupations in that year (Pennell, 1971).

The idea to educate these members of the smaller health categories through shared and coordinated educational activities began in 1929 at St. Louis University where a program for training X-ray technicians was appended to the School of Nursing. Years later in 1950, Dean Wesley Hutchinson established the School of Allied Health Professions at the University of Pennsylvania, Philadelphia. In 1957, the College of Health Related Professions was established at the University of Florida, Gainesville, and the Division of Allied Health Sciences at Indiana University followed the next year. Deans Darrel J. Mase at Florida and Lynn Arbogast at Indiana, thus joined Dean Hutchinson as the pioneer group of allied health education

administrators. Until 1967, however, these earliest allied health units went their own ways and conducted their own business, largely without reference to one another (McTernan, 1972).

The Allied Health Profession Educational Assistance Act was signed into law in 1966, and on May 27, 1967 the Association of Schools of Allied Health Professions was begun with Dr. Darrel J. Mase elected as its first President. In a sense, Allied Health as a definable area of professional interest, traces its origin back to the first official meeting of the deans of thirteen schools identifying with the same general orientation toward allied health: St. Louis University, University of Pennsylvania, University of Florida, Indiana University, University of Illinois, Northeastern University, State University of New York at Buffalo, Boston University, Loma Linda University, Medical College of South Carolina, Ohio State University, Temple University and University of Kentucky.

Almost one hundred institutions (universities, colleges and community colleges) could be identified by early 1971 as having major interests in the allied health fields. Community Colleges across the nation deserve much credit for their commitment and contributions to the allied health field; professional socities, too, for their pressure to increase valid education for their members. Commitment by colleges and the professional societies made the development of the allied health concept inevitable. Of crucial importance was the recognition of both the concept and the term "allied health" by the federal government which established the Division of Allied Health Manpower as the chief instrument for the implementation of the Allied Health Professions Educational Assistance Act of 1966 and subsequent amendments (McTernan, 1972).

The Miami-Dade Community College Board of Trustees in January 1972, with a

pronounced commitment toward its students and the health care community of South Florida, initiated proceedings for a multi-million dollar Medical Center Campus to be constructed near the Dade County hospital complex. The purpose of the Medical Center was to provide a physical facility for the instruction of 1,800 to 3,000 students in the allied health professions (Zabsky, 1974).

The history of the Medical Center began in 1966-1967 when the Allied Health programs were developed as a Division within North Campus. Nursing Education, then underway for three years, was moved from the Technical Division into the new Division that same year. By 1970, the programs had grown from a unit employing largly part-time faculty to 542 students and 44 faculty. Facilities for all classes and laboratories were borrowed and shared on North Campus with the clinics held in barracks. In 1971, the major portion of the programs were moved to the Fred Ascher Building on Miami Beach. Three programs and the Division Office remained on North Campus. When the Division was designated Campus Status in 1974, the administrative office moved to the Fred Ascher Building while the student services office and three programs remained on North Campus. One section of nursing education continues at South Campus with program linkage with the Medical Center Campus.

The Medical Center Campus is unlike the multi-purpose Campuses comprising the Community College District. The programming in the Medical Center Campus must be an integral part of agencies external to the College. These agencies represent a component of curriculum which the College could not provide independently. Accordingly, the campus administration serves as the focus within the College structure for maintaining the interrelationships with clinical agencies, other educational institutions, legislative and credentialing activities, and with the

multipurpose campuses in planning support programs for the health specialities.

Each of the Associate Degrees and Certificate programs consists of technical-clinical courses, basic science and general education courses (Zabsky, 1974). Each of these programs is limited to access, high cost ratio, speciality curricula with specific selection critieria for screening the many students applying for enrollment.

Ongoing articulation between other campuses of the College and the Medical Center Campus is maintained in order that the allied health student will receive the pertinent scientific background as a basis for technical studies. The required basic science and general education courses are taught by faculty in their respective areas; e.g., biology is taught by a biologist. The content of the biology course is based upon performance objectives as developed by faculty in the various allied health fields in conjunction with the Department of Biology on another campus. A similar situation occurs in other academic areas in content determination of non-allied health courses.

Each program in the Medical Center Campus requires that the student receive clinical experiences of varying types and lengths before graduation. In two programs, the Optometric Technician and Dental Hygiene programs, the College established and is administering an operational clinic in each program in order to assure each student appropriate clinical experiences. In the remaining allied health programs, over forty health agencies - hospitals, nursing homes, mental health facilities, public health facilities, etc. - are affiliated with the College by written contract in providing facilities for required clinical experiences. Before graduation, each student completes clinical experiences in a wide variety of institutions consistent with the objectives of the particular program in which the student is enrolled.

A county-wide Occupational Program Coordinating Council for Dade County has been established with membership composed of occupational program administrators from Miami-Dade Community College and the extensive county Board of Public Instruction vocational education system. The primary concern of the Council deals with decision-making in the designation of responsibility for occupational programs in the county.

Considerable discussion has also taken place with local and statewide universities concerning the coordinated development of allied health programs. The Medical Center Campus is continually striving for improved articulation between two-year technology programs and allied health programs at the baccalaureate level so that qualified students can transfer to the university without loss of previously earned credits.

State-wide collaboration includes the coordination for the State-wide Common Course Designation and Numbering System Project of all Medical, Dental, Allied Health and Veterinary Science Courses. This responsibility was designed by the Department of Education in 1974.

The Medical Center Campus is quite conscious of the future of allied health and those individuals who are being selected as the future professionals. The campus as a whole is committed to the health care practitioners and their educational training. Their success will determine the future of the campus.

PREDICTIVE STUDIES REVIEWED

Within this component of chapter two there is a review of the varied studies relating directly to the investigations of predictive criteria in the admissions selection process. The various papers illustrate the variety of methodologies

utilized in determining valid correlations between variables and educational achievements. This review assisted the researcher in obtaining information from previous investigators in predicting success in educational disciplines and also aided him in gaining knowledge of the design of similar statistical studies.

In 1965, Lavin reviewed most of the research on academic and performance prediction and concluded that multivariate methods which employ multiple predictors and multiple regression analysis or discriminate analysis are essential for productive work in the area of predictive studies.

The investigation of Dennison (1971), Harding (1974), Munday and Hoyt (1965), Rubin (1971), and Thomas and Stanley (1969), support the use of ability testing, particularly of those purporting to identify verbal ability as the most valid predictors of college grades. Further support for testing is found in the report of Menacher, Paraskevopoulos, and Robinson (1971) who studied nearly 600 students. They reported that very few freshmen from the top half of the high school class who had American College Testing Program Examination (ACT) composite scores of fifteen (15) or below, had clear status after one year of college. Astin (1971) found a positive correlation between high school grades and aptitude test scores and that a combination of both variables increased the correlation with freshmen grade point average.

Hopper (1968) used multiple regression analysis and found that out of thirty-one variables, the student's high school grade for a specific subject area and his overall high school grade point average were valid predictors of first semester college grades.

Rice (1968) found that the student's high school composite grade point average has

less relevance for predicting academic success than his performance in specific subject areas. Rice also found, in his study of the predictive validity of the Washington Pre-College Test (WPCT), that high school English and high school Social Science has the highest correlation coefficients while quantitive skills reflected consistently less relationship to academic success. In addition, he found that mechanical reasoning, spatial ability, reading speed, age and sex had a very minimal relationship to the criterion (grade point average on 16 introductory courses at Yakima Valley College). When considered individually, these variables did not contribute a significant degree to the overall predictability of the WPCT.

Miller (1974) found from her study she could identify a number of successful prediction factors. Among these were the student's own estimate of the lowest grade the student would find acceptable in each of the courses enrolled in, several indices of creative thinking, ability, overall average of high school grades, the student's parents' educational levels, SAT scores or Nelson-Denny Reading Test Scores, the student's educational level before entering the nursing education program, a test anxiety measure, and being or not being on probation at the time the prediction was made. Miller felt these variables could be assessed without great difficulty. Miller also concluded that the SAT and the Nelson-Denny were about equally effective when added to a battery of predictors in a regression analysis. Miller stated that both added significant increments, especially in the prediction of the psychiatric and medical Nursing State Board examination scores. However, the Nelson-Denny might be preferred because it yields some diagnostic information about student's reading abilities which might be useful in a remedial program.

Recent research studies (Willett, Riffel, Breen and Dickson, 1971; Owen and Feldhusen, 1971; Gusik and Harckham, 1973) have indicated that prediction formulas

can be developed to predict student performance in specific courses, grade point averages, success or failure to graduate and State Board Examination performance.

Owen and Feldhusen (1971) developed multiple regression equations to predict semester grade point averages for nursing students. They suggested that the use of high school grades and one or two ability measures permit economical predictions of first semester index. For predicting subsequent semester averages, these authors suggested the use of prior semester averages in combination with a reliable ability measure.

Lynch (1972) developed a predictive model that indicated one test, the School and College Aptitude Test (SCAT) which has been used by many community colleges and technical institutes, was not as valid a predictor for entering college freshmen as was the College Qualification Test (CQT).

A report from the Department of Health, Education and Welfare Office of Education (1971) supports high school grade point averages as the best overall predictor of college grades for both minority and white freshmen. These same reports identified the Scholastic Aptitude Test - Verbal (SCATV) score to be a more consistent positive predictor for whites than minorities. Thomas and Stanley (1969) reported that for blacks, test scores are better predictors of college grades than are high school grades. Cross (1971) reports her summary of findings from seven studies which indicated that traditional admissions tests tend to predict college grades equally well for non-whites as for whites.

Richards and Lutz (1967) reported on a study which assessed the predictive validity of the American College Test (ACT). The study stated that ones non-academic achievement could be predicted with moderate success, since it appeared that non-

academic accomplishment was independent of academic potiential and acheivement.

Benjamin and Powell (1971) found that a large number of students with high school achievement below the recommended minimums for regular admission status were unsuccessful in achieving passing grades in college. Their studies support high school academic excellence as a prerequisite to college admission. Benjamin and Powell caution, however, against the prediction of college success solely on the basis of purely academic measures, as thirty-five percent (35%) of the high "risk" students successfully completed their first semester in college with at least a 2.0 grade point average.

Doebler (1970) and Nicholson (1971) reported that a non-academic measure known as the Admission Index (AI) was developed as a part of the study at Brown University which attempted to determine new success and adminissions criteria for potentially successful "risks". The Admissions Index is comprised of ratings by high school counselors on academic success, personal promise and motivation. The AI measures motivation, which Doebler (1970, page 24) says, ". . . is more important than the test results". According to Nicholson (1971, page 8), the AI appears to be capable of ". . . discriminating between groups defined by academic achievement". It also has the ". . . ability to rank them identically to that of GPA for the first semester, the foresight of which the admissions officer does not possess".

Also developed as part of Nicholson's study on "academic risks" was an instrument called the Environmental Index (EI) which consists of quantified biographical information, such as socio-economic background. The EI was validated, not only as an effective predictor of success in college, but also as a predictor of admission to graduate school and of subsequent job success. There is some indication that

biographical data may be a more valid predictor than personality scales. This study established that admissions officers or admissions committees could select successful students by combining data provided by traditional admissions criteria with new, non-academic information provided by the Admission Index and Environmental Index.

In 1976, Ballinger felt the lack of scientific studies on predictive criteria for evaluating the potential of students in radiologic technology warranted an investigation. During a ten year period students were subjected to the American College Testing (ACT) examinations. These scores were subsequently compared with the students' scores on examinations of the American Registry of Radiologic Technologists and high school grades in pertinent subjects, to see if any predictive factors were evidenced. The results showed significant correlation of some of these factors with the Registry score of sufficient statistical significance to warrant using them as a part of the process for selecting students for radiologic technology programs.

The objectives of the study were to identify those predictors which were most closely related to success as measured by the total Registry examination. Ballinger felt that the predictors identified in his study might then be used when selecting students for admission into two-year radiologic technology educational programs across the United States. The predictors he evaluated included: rank in the high school graduating class, number of natural science courses taken in high school, number of mathematics courses taken in high school, average earned high school English grade, average earned high school mathematics grade, average earned high school natural science grade, the four academic subjects and the composite score of the ACT test.

Five important conclusions were reached as a result of this study:

1) The major conclusion was that one could predict student success on the Registry examination by using: Rp= 0.0919 (high school %) + 0.4251 (ACTe) plus 7.6230 formula with statistical significance.

2) The most significant predictor was the high school percentile rank which supports the theory that student motivation is an important characteristic in determining success.

3) The significance of success in English supports the opinion that a successful radiologic technologist must accurately evaluate the physician's consultation request and perform the study to include the projections which best demonstrate the parts of interest.

4) There resulted low correlations with the number of national science and mathematics courses taken.

5) The predictive equation developed in this study is not recommended to be used as the only criteria in selecting radiologic technology students. It was recommended however, that the formula be considered as one of several selection criteria.

FUTURE TRENDS

Predicting success in allied health curricula is a critical issue. There is no apparant method for assuring the most qualified and dedicated applicants will be accepted. Even the most prescient admissions criteria are bound to filter out potentially dedicated and capable candidates. Equally distressing to admissions committees

and allied health administrators is the admission of a student into a program he or she is not suited for. Shulman and Elstein (1971) have speculated that a random selection or lottery might be better used in our present circumstances. This would, according to them, at least insure that any selection errors were unrelated to any characteristics of the applicants or of the selectors. Shulman and Elstein have suggested that a random selection might be experimentally performed to obtain a segment of any entering class. Such a trial test could provide base line data against which to compare the effectiveness of selection procedures.

There is speculation that computerized matching of applicants with schools will be the trend in the future. In 1972, Robert Wiseman, Ph.D., outlined a computerbased technique for selecting candidates. A multivariate formula was created as a device to insure fairness, informity and economy of committee time. The formula developed attempted to mimic committee action, using parameters commonly evaluated for each applicant. The squared parameters were weighed and summed according to committee philosophy. Other admissions committees could use the same formula by altering the weights of the variables to reflect the philosophy of a particular selection committee. By combining data about students with the simulation model, computer selections could be made to correlate with the actual committee selections. While such computer simulation models helped interviewing committees to select students in a manner that is in tune with the committee's philosophy, there is no evidence that such selection correlate to students' success (Weinberg, 1972).

Health care schools are also looking at placing a greater emphasis on noncognitive characteristics of applicants. Schools are admitting applicants from the behavioral sciences with limited backgrounds in the sciences, but who have demonstrated competence in relating successfully with other human beings. The well-rounded

person is being selected rather than the traditionally recruited science major (Chaisson, 1976). We can only speculate as to whether such a recruitment philosophy will remain an oddity or whether it will function as a guide for future selection processes. No doubt its ultimate impact for change will depend upon the results of longitudinal research studies currently in progress which will provide some definitive data on the success of applicants in the field.

The era of unvalidated decision-making in the admission of students to health professions' schools appears to be at an end. Growing numbers of students with a heightened awareness of their legal rights who are challenging current admissions systems are forcing a greater precision in defining criterion measures for admission. The investigation of predictive admissions criteria is becoming more and more vital to the success of allied health institutions.

SUMMARY

A brief sketch of the historical development of allied health, a review of selected research studies pertaining to predictors of academic achievement and a short look at future trends in the admissions selection process were presented in chapter two.

The selected research studies were reviewed to give indications as to the current status of selection predictors for admission proceedings in institutions of higher education in the United States. The review dealt with samples of predictive studies which were conducted relative to the prediction of college achievement and which generally are relevant to this investigation.

The review indicated that traditional measures such as the ACT, SAT, Nelson-Denny Reading Test Scores and high school grade point averages provide varying degrees of reliance as predictors of success by being combined with other criteria. Some of the promising potential predictators are non-academic criteria which, when combined with traditional academic criteria, provide meaningful and useful predictors of success. These new criteria appear to warrant close study for possible adoption by admissions officers and selection committees.

Hinkle and Houston (1976) have proposed a different approach for predicting academic success of selected students enrolled in a comprehensive community college. Hinkle and Houston contend that neither the classical statistical models nor the counselor-selection models have typically utilized all the information regarding a student. They felt there was a need for more efficient and effective

guidance-selection models. In this context, the Bayesian-type model was proposed because it utilized the strengths of both the classical statistical and the counselor-selection models.

The Bayesian-type research design was presented as an effective model for estimating probabilities of program completion and predicting first quarter grade point average (GPA). Bayesian Model I - Estimating Probabilities of Program Completion, was developed from Bayes' formula with counselors input as prior probabilities and posterior probabilities of graduate status of the discriminate analysis function as likelihoods. The efficiencies of the Bayesian-type models were compared and evaluated in terms of two counselor selection models and two classical statistical models.

The results of the study indicated that there were little differences in the prediction efficiencies of the three models in reducing the weighed average absolute-errors of the curricula investigated. Because several investigators (Nicholson, 1973 and Savicki and others, 1970) have noted that dropouts were not different from successful persisters on predicted GPA, the study concluded that there was a greater need to learn more about prediction of graduation from college as a criterion of college success rather than college GPA. This fact was considered especially true for allied health curricula because in most cases, graduation itself is the key to entering the occupational fields.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The validity of selected variables as predictors of grade point average, withdrawal and graduation from four allied health programs at the Miami-Dade Community College Medical Center Campus, Miami, Florida were investigated in this study. The investigators examined the predictor variables to assess the individual and combined effects in predicting graduation from Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology.

The design and methodology employed in studying predictors of the four programs are discussed in this chapter. Focus is on the definition of the population, the procedures utilized to collect data and the research hypotheses that will be tested.

DESIGN OF THE STUDY

The basic design of this study was a multiple regression analysis of the "ex post facto" mode as described by Kerlinger (1973). The purpose of this model was to study the effects of the independent predictor variables (high school grade point average, number of high school natural science courses, high school English grade, high school grade in natural science, high school grade in mathematics, percentile rank in high school graduating class and Miami-Dade Community College grade point average prior to selection) on the dependent variables (grade point average, withdrawal or graduation from each of the four allied health programs) using principles of correlation and regression. Because this procedure has been used extensively in predictor research studies and has proven to be an effective model,

the researcher believed this type of design would be more appropriate than a quasi-experimental approach such as the Bayesian-type model (Hinkle, 1976).

The basic idea of multiple regression analysis is that variables X_1, $X_2 \ldots X_k$ are used to predict Y. The method and calculations are accomplished in a manner to give the best prediction possible, given the correlations among the variables. In other words, instead of saying: If X, then Y, it is stated: If X_1, $X_2 \ldots X_k$, then Y, and the results of the calculations tell us how valid the prediction is and approximately how much of the variance of Y is accounted for by the best linear combination of the independent variables (Kerlinger, 1973).

Multiple regression analysis is the assessment of the influence of several variables on the criterion variable. An example of this type of procedure would be if a researcher wished to predict the achievement of student success on the State Board of Nursing Examination (Y), from variables such as the student's ACT social science score (X_1) and the student's grade point average in Nursing Theory Lab (X_2). To determine correlations between these variables, the researcher would have to calculate deviation sums of squares, the deviation cross products, the standard deviations and then the correlations among the three variables. These are the basic statistics that would be calculated for almost any set of data. With these calculations, the researcher could then concentrate on the fundamental prediction equation:

$$Y^1 = a \& b_1 x_1 + \ldots\ldots b_k x_k$$

The symbols mean:

Y^1 - predicted variable
a - intercep and constant
b_1 - regression coefficient
x_1 - independent variable

The intercept concept is the point where the regression intercepts the Y axis. It is calculated with the formula:

$$a = y - bx$$

The higher the correlation between predicted values of Y, the more accurate the predictions (Kerlinger, 1973).

Linked to the basic prediction formula is the principle of least squares. The objective of the determination of the b's in the prediction equation is to find those regression coefficient values that will minimize the sums of the squares of the residuals. The least squares principle is used to minimize the errors of prediction. In multiple regression analysis one weights the individual independent variables so that the best prediction is possible under the conditions of the relations among the independent variables, and between the independent variables and the dependent variable (Kilmer, 1975).

Also associated with multiple regression analysis is the index titled multiple correlation coefficient, R. This index is the ordinary product-moment coefficient of correlation between the predicted values (Y^1) and the observed values of Y. Kerlinger states (1973, page 616) ". . . the theory of multiple regression seems to be especially elegant when we consider the multiple correlation coefficient. It is one of the links that bind together the various aspects of multiple regression and analysis of variance." The multiple correlation coefficient is the highest possible correlation between a least square linear composite of the independent variables and the observed dependent variable.

Multiple regression analysis has proven to be very useful and practical in research studies of a predictive nature. As Kilmer states (1975, page 29) ". . .A noted

strength of multiple regression analysis is its yield of various statistics to be used in the interpretation of data, e.g., in measures of overall relation between the independent variables and the dependent variable, R^2 (an estimate of the proportion of variance accounted for by all the variables or any subset); regression coefficients; squared semipartial correlations and partial correlations." He also mentioned weakness in multiple regression analysis which he stated, if recognized, could be compensated for. Kilmer stated (1975, page 29) ". . .In lieu of the indescriminate use of too many variables, factor analysis and theory could be used to reduce those weaknesses to a workable number. Factor analysis is a method for reducing a large number of variables to a smaller number of presumed underlying units called factors."

Multiple regression analysis is an effective method for estimating the magnititude of different sources of influence on the dependent variable (Y). It tells how much of Y is presumably due to independent variables (X_1, X_2. . . . .X_k). It gives some idea of the relative amounts of influence of the X's. And it furnishes tests of the statistical significance of combined influences of X's on Y and of the separate influence of each X. In short, multiple regression analysis is an efficient and powerful hypothesis - testing and inference - making technique (Kerlinger, 1973).

POPULATION OF THE STUDY

The population of this study was the accepted applicants to the allied health programs who entered the Medical Center Campus in the Fall Term, 1974. All of these students were high school graduates because each of the Medical Center Campus programs, in compliance with state and national registry boards, require high school graduation as a pre-requisite. All of the students were required to

submit high school transcripts as part of their pre-selection admission packet. The results of the students' high school grades, number of natural science courses, English grades, natural science grades, mathematics grades, percentile rank in high school and Miami-Dade Community College grade point average prior selection were used to determine the validity of the selection predictors of the four technical programs of this study.

Approximately four hundred and seventy (470) applicants in August, 1974, applied to the Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology programs. Ninety-One (91) were accepted and enrolled as follows:

28 Dental Hygiene
23 Medical Laboratory Technology
25 Medical Records Technology
15 Radiologic Technology

Eleven percent (11%) of the population were male, eighty-nine percent (89%) were female. Eleven percent (11%) were recent high school graduates (within 1974), three and 1/3 percent (3 1/3%) were college transfer students and eighty-five and 7/10 percent (35.7%) were Miami-Dade Community College continuing students. The mean age of the population was twenty six years.

The total population was selected to enroll in the four programs as good potential applicants who were predicted to graduate from the four technical programs within a two year period (August 1974 to April 1976). All the students were enrolled as full-time Miami-Dade Community College students carrying the minimum twelve semester credit requirement and all were pursuing an Associate in Science degree at the Medical Center Campus of Miami-Dade Community College.

COLLECTION OF DATA

To measure the effectiveness of the seven independent variables (high school grade point average, number of high school natural science courses, high school English grades, high school grades in natural science, high school grades in mathematics, percentile rank in high school graduating class and college grade point average) upon the dependent variables (grade point average, withdrawal and graduation from the four technical programs) within the Miami-Dade Community College Medical Center Campus, the following procedures were used. Initially, the Dean of Instruction of the Allied Health Technology Programs was contacted. A meeting was scheduled with the investigator of this study, the Dean and the Medical Center Campus Vice President to discuss methodology and collection of data procedures. It was decided upon conclusion of the meeting that the researcher should individually contact the respective four department chairpersons for assistance in the data collection. Each chairperson was contacted and asked to provide a list of accepted applicants for the Fall Term, 1974. After compiling the list, the Miami-Dade Community College student numbers and the student names were submitted to the North Campus Records Department (Medical Center Campus student records at the time of writing of this project had not yet been transferred to the new campus facility which was scheduled for occupancy in May, 1977) to obtain the individual student high school transcripts, applications for admission and permanent record file. Grade point averages, percentile rank, number of natural science courses, withdrawals, high school and college graduation dates were determined by examining each of the permanent records.

This study reviewed the high school performance records and the Miami-Dade

Community College grade point average prior to selection and enrollment into the four programs. Those students who were accepted were selected by screening devices employed by the four allied health programs. Each student was considered a good prospect to graduate from each of the Associate in Science degrees within the two year period. The filters used as selection predictors were considered valid in determining the graduation of each student. Withdrawals and incomplete course accomplishments were noted in the analysis of the data.

Analysis of the findings are presented in chapter four of this study. The data are graphically depicted in tables. The tables are used to show correlation coefficients of variables, multiple regressions and predictor equations. The data collected will be shown to the Medical Center Campus Management Council for discussion, review and evaluation. The Miami-Dade Community College North Campus Education Research Specialist agreed to assist the researcher in the data analysis. He recommended the investigator review Norman N. Nie's book, Statistical Package for the Social Sciences, (SPSS) second edition. This SPSS was used to compute the data analysis. To assist the researcher in handling the data, a chart was developed to organize and code the individual student information. The data collected were then placed on computer keypunch forms as follows:

1. Student identification number
2. New Freshmen/Continuing/Transfer
3. High school grade point average
4. Number of high school natural sciences courses
5. High school English grade
6. High school grade in natural science
7. Number of high school mathematics courses
8. High school grade in mathematics
9. Percentile rank in high school graduating class
10. Miami-Dade Community College prior grade point average, if applicable
11. Program
12. Sex
13. Final Grade Point Average at Miami-Dade Community College
14. Graduate/Non-Graduate/Continuing
15. Age

The key punch forms were submitted to the North Campus Computer Center for computer programming and final analysis.

HYPOTHESES

The following hypotheses, concerning the students' academic performance in high school and college were tested in order to assess the effectiveness of the selection predictors of the four allied health programs (Dental Hygiene, Medical Laboratory Technology, Medical Records Technology, and Radiologic Technology) at the Medical Center Campus of Miami-Dade Community College. Significance at the .05 probability level or less was used for rejecting the hypotheses.

Hypothesis 1: High school grade point averages are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 2: The number of high school natural science courses taken are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 3: High school English grades are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 4: High school grades in natural science are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 5: High school grades in mathematics are significant in predicting college grade point average, withdrawal and graduation from

four allied health programs.

Hypothesis 6: The percentile rank earmed in high school is significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 7: The Miami-Dade Community College prior selection gradepoint averages are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

SUMMARY

Chapter three presented the research design, methodology, population, data collection procedures and research hypothesis for this investigation. The typical student under study is a female, approximately twenty six years old, who was already enrolled at Miami-Dade Community College prior to acceptance into the Medical Center Campus. The design of this study is a multiple regression analysis model which is quite effective in determining the influences of several variables upon one independent variable.

CHAPTER 4

SUMMARY OF FINDINGS

The purpose of this research project was to assess the validity of the selection criteria of four Allied Health programs of the Medical Center Campus of Miami-Dade Community College, Miami, Florida. The independent predictor variables studied were: high school grade point average, the number of high school natural science courses taken, high school English grades, high school grades in natural science, high school grades in mathematics, percentile rank in high school and the Miami-Dade Community College grade point average at time of selection into one of the four programs. The dependent variables researched were final grade point average, withdrawal and graduation from each of the programs.

The hypotheses employed to test the effectiveness of the four allied health selection predictor variables at the .05 probability level were as follows:

Hypothesis 1: High school grade point averages are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 2: The number of high school natural science courses taken are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 3: High school English grades are significant in predicting

college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 4: High school grades in natural science are significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 5: High school grades in mathematics are significant in predicting college grade point average, withdrawal and graduation from four allied health programs.

Hypothesis 6: The percentile rank earned in high school which is significant in predicting college grade point average, withdrawal and graduation from the four allied health programs.

Hypothesis 7: The Miami-Dade Community College prior selection grade point averages are significant in predicting college grade point average, withdrawal and graduation from four allied health programs.

The population studied was ninety-one entering students, Fall Term, 1974 for the four allied health programs: twenty-eight Dental Hygiene students, twenty-three Medical Laboratory Technicians, twenty-five Medical Records Technicians and fifteen Radiologic Technology students. The permanent record files of the ninety-one students were individually researched to collect the data from the student's high school and college transcripts. It is important to note that some transcripts were incomplete.

Multiple regression analysis, stepwise correlations, predictor equations and F tests

were used in the analysis of the data. The new Statistical Package for the Social Sciences (SPSS) catalog procedure as described in the SPSS supplement manual A-005-306, version 6.02 was used to obtain a computer program to calculate stepwise correlations, multiple R, adjusted R square, standard error, analysis of variance, regression, residual, sum of the squares, mean squares, standard deviation, range and F values. Critical values of F were utilized to compute the level of significance of each independent variable to the dependent variables within each of the four allied health programs. It is important to note that there were not enough withdrawal cases within each Allied Health program to obtain sufficient F values for calculations.

To obtain critical values of F, the degrees of freedom of each set of independent variables to the dependent variables within the four programs were derived from the following formula:

$$DF = \frac{1}{N-K-1} \text{ where}$$

N is the number of individuals within the group, K is the number of variables in the predictor equation. Upon calculation of the degrees of freedom (DF), the critical value of F was obtained from a matrix table using the numerator and denominator of each equation (i.e., $DF = \frac{1}{28-7-1} = \frac{1}{20} = 4.35$ critical value of F at the .05 level or 8.10 at the .01 level).

The obtained F of a particular variable was significant if it was equal to or greater than the actual value of F taken from the table (Kerlinger, 1973).

The data collected and the findings of the testing of each hypotheses were separated in this chapter into the four allied health programs. A short paragraph

is used to introduce the reader to the student group that was researched. Subsequent tables depict the summary findings of the stepwise correlations of independent variables to dependent variables, grade point average and graduation. The third dependent variable was deleted because so few students withdrew. Additional tables are used to describe student graduate and withdrawal profile information. The four allied health programs analysis findings are presented in this order: Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology.

DENTAL HYGIENE

In August 1974 twenty-eight individuals were accepted and enrolled into the Miami-Dade Community College Medical Center Campus Dental Hygiene program. Six of these students (21.4%) were new college freshmen just having graduated high school, twenty (71.4%) were Miami-Dade Community College campus transfers and two people (7.1%) were external college transfers. All twenty-eight (100%) were females with twenty-seven (96.4%) graduating and one (3.6%) having to withdraw. The mean age of the group was twenty-three with the range from nineteen years to thirty-six.

Table 1 is used to describe the Dental Hygiene group with the mean, variance, standard deviation, minimum and maximum values of each of the seven independent variables.

TABLE 1

DENTAL HYGIENE STUDENT INDEPENDENT VARIABLE PROFILE

N = 28 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	3.02	0.20	0.09	0.44	2.15	3.80
Number of High School Natural Science Courses	2.22	0.49	0.13	0.70	1.00	3.00
High School English Grade	3.14	0.16	0.08	0.40	2.14	3.84
High School Grade in Natural Science	2.85	0.30	0.11	0.55	1.57	3.66
High School Grade in Mathematics	2.73	0.44	0.13	0.66	1.33	4.00
Percentile Rank in High School	72.60	459.33	4.29	21.43	2.00	84.00
MDCC GPA at time of Selection	3.18	0.58	0.16	0.76	1.25	4.00

The Dental Hygiene group had an average final high school grade point average of 3.02, a mean of 2.22 natural science courses taken, a 3.14 English grade average, a 2.85 grade in high school natural science courses and a 2.73 grade in mathematics. The particular group completed high school with a mean percentile rank of 72.60 and the group entered the Dental Hygiene program with an average Miami-Dade grade point average of 3.18.

To assess the validity of the Dental Hygiene group's academic performance as

selection predictors of grade point average, withdrawal or graduation from the allied health program, the seven hypotheses were tested at the .05 probability level. The results were that hypotheses #1, #2, #3, #4, #5 and #6 were rejected and hypotheses #7 was not rejected.

The results show that the only significant predictor of final college grade point average was the Miami-Dade Community College grade point average at time of selection. Table 2 is used to illustrate the results of the multiple regression analysis of the seven independent variables to the dependent variable final grade point average for the Medical Center Campus Dental Hygiene program. Statistics were not calculated to show significance rank order of the independent variables to the dependent variable graduation because F levels were insufficient for calculations. Graduate student variable profile data is shown in table 3.

Limited data were available for the one student who did not complete the Dental Hygiene program. Data that were accessible showed the student to be female, twenty-three years old with a Miami-Dade Community College grade point average of 3.00 at time of selection and a 2.93 GPA at time of withdrawal.

TABLE 2

DENTAL HYGIENE

Significance Rank Order of Independent Variables to GPA

N = 28 Independent Variables	F
MDCC Grade Point Average at Selection	16.83*
Percentile Rank in High School	0.86
High School Grade in Natural Science	1.40
High School English Grade	1.64
High School Grade Point Average	0.86
Number of High School Natural Science Courses	0.25
High School Mathematics Grade	0.06

Critical Value of F:4.35

* Significant variable at .05 level.

Note: The obtained F is significant at the .05 level if it is equal to or greater than the critical value of F.

TABLE 3

DENTAL HYGIENE

GRADUATE VARIABLE PROFILE

N = 27 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	3.02	0.20	0.09	0.44	2.15	3.80
Number of High School Natural Science Courses	2.22	0.49	0.13	0.70	1.00	3.00
High School English Grade	3.14	0.16	0.08	0.40	2.14	3.84
High School Grade in Natural Science	2.85	0.30	0.11	0.55	1.57	3.66
High School Grade in Mathematics	2.73	0.44	0.13	0.66	1.33	4.00
Percentile Rank in High School	72.60	459.33	4.29	21.43	11.00	98.00
MDCC GPA at time of Selection	3.18	0.61	0.17	0.78	1.25	4.00

This group had a mean high school grade point average of 3.02, they enrolled in approximately two natural science courses, they earned an average English grade of 3.14, a 2.85 grade in Natural Science, they were at the 72.6 percentile of their graduating class and they had an average grade point average of 3.18 upon acceptance into the program.

MEDICAL LABORATORY TECHNOLOGY

Twenty-three students initially enrolled in the Miami-Dade Community College Medical Center Campus Medical Laboratory Technician program in August 1974. All twenty-three (100%) were Miami-Dade Community College campus transfers. Three (13%) were male and twenty (87%) were female. Nine (39.2%) completed the program and graduated in July 1976, seven (30.4%) are still currently enrolled and seven (30.4%) had to withdraw. The mean age of the group was twenty-five with the ages ranging from twenty-one to forty-one.

Table 4 is used to describe the Medical Laboratory Technology group in terms of the mean, variance, standard error, standard deviation, minimum and maximum values of the seven independent variables.

TABLE 4

MEDICAL LABORATORY TECHNOLOGY STUDENT INDEPENDENT VARIABLE PROFILE

N = 23 Independent Variable	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.55	0.29	0.11	0.53	1.42	3.50
High School Natural Science Courses	2.50	2.26	0.32	1.50	1.00	7.00
High School English Grade	2.82	0.30	0.12	0.55	1.50	4.00
High School Grade in Natural Science	2.77	0.32	0.12	0.56	2.00	4.00
High School Grade in Mathematics	2.36	0.40	0.14	0.64	1.00	4.00
Percentile Rank in High School	66.24	447.29	4.62	21.15	6.00	82.00
MDCC GPA at time of Selection	2.62	0.71	0.18	0.84	1.00	4.00

This group had a mean high school grade point average of 2.55, had an average of 2.5 natural science courses taken, the group's mean English grade was 2.82, its natural science GPA was 2.77. The Medical Laboratory Technology's grade in mathematics was 2.36 the group was in the 66.24 percentile of its high school and the mean Miami-Dade GPA prior to selection was 2.62.

To test the effectiveness of the Medical Laboratory group's above academic performance as selection predictors of final college grade point average, withdrawal and graduation from the program, the seven hypotheses were tested at

the .05 probability level.

The results were that all predictor variables were insignificant in predicting the dependent variable final grade point average. Therefore all hypotheses were rejected. The multiple regression analysis, however, relating to the dependent variable graduation showed that the independent variable high school grade in natural science, was most significant in predicting graduation followed by the student's high school English grade as the next most significant variable. In this instance, hypotheses #3 and #4 were rejected in part. High school grades in natural science and in English proved to be valid predictors of graduation from the Medical Laboratory Technology program.

The following tables are used to depict the results of the stepwise correlations to the two dependent variables. Tables #5 and #6 are used to demonstrate degrees of significance of each of the seven independent variables to the dependent variables final grade point average and graduation.

Table #7 is employed to illustrate the graduate student profile data and Table #8 is utilized to depict the student withdrawal information.

TABLE 5

Medical Laboratory Technology

Significance Rank Order of Independent Variables to GPA

N = 23 Independent Variables	F
High School Grade in Natural Science	0.55
High School Grade Point Average	2.17
Percentile Rank in High School	1.60
Number of High School Natural Science Courses	0.57
High School English Grade	0.26
MDCC Grade Point Average at Selection	0.13
High School Mathematics Grade	0.12

Critical Vaule of F:4.54.

All independent variables were insignificant at the .05 level in predicting final grade point average.

TABLE 6

Medical Laboratory Technology

Significance Rank Order of Independent Variables to Graduation

N = 23 Independent Variables	F
High School Grade in Natural Science	6.00*
High School English Grade	4.54*
High School Mathematics Grade	0.87
MDCC Grade Point Average at time of Selection	0.24
Number of High School Science Courses	0.11
High School Grade Point Average	0.10

Critical Value of F:4.49.

* Significant variables at .05 level.

Percentile Rank in High School not in the predictor equation due to insufficient tolerance level for computation.

TABLE 7

Medical Laboratory Technology

Graduate Variable Profile

N = 9 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.64	0.41	0.21	0.64	1.42	3.50
Number of High School Natural Science Courses	2.40	3.53	0.63	1.88	1.00	7.00
High School English Grade	2.71	0.57	0.25	0.75	1.50	4.00
High School Grade in Natural Science	2.99	0.50	0.24	0.71	2.00	4.00
High School Grade in Mathematics	2.60	0.38	0.21	0.62	2.00	4.00
Percentile Rank in High School	66.33	569.50	8.00	23.86	18.00	94.00
MDCC GPA at time of Selection	2.76	0.33	0.19	0.58	1.55	3.50

The graduates of the Medical Laboratory Technology Program had an average high school grade point average of 2.64, they enrolled in two natural science courses, their average English, Natural Science and Mathematics grades were 2.71, 2.99 and 2.60. They graduated high school at the 66th percentile, and they entered Medical Laboratory Technology with a 2.76.

TABLE 8

Medical Laboratory Technology

Student Withdrawal Student Variable Profile

N = 7 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.35	0.24	0.19	0.49	1.60	2.88
Number of High School Natural Science Courses	2.43	2.29	0.57	1.51	1.00	5.00
High School English Grade	2.75	0.05	0.08	0.22	2.50	3.00
High School Grade in Natural Science	2.79	0.12	0.13	0.35	2.50	3.50
High School Grade in Mathematics	2.15	0.35	0.23	0.60	1.50	3.00
Percentile Rank in High School	63.33	652.67	10.43	25.55	18.00	89.00
MDCC GPA at time of Selection	2.99	1.24	0.42	1.11	1.00	4.00

The group's average high school grade point average was 2.35 with 2.43 natural science courses taken. The students' English grade was 2.75, the groups' natural science grade was 2.79. The groups' mean grade point average in high school math was 2.15, the group graduated high school within the 63.33 percentile rank and the Miami-Dade GPA at time of selection was 2.99.

As of the Fall Term 1976, seven students of the orignial twenty-three were still enrolled in the Medical Laboratory Technology program at the Medical Center Campus.

MEDICAL RECORDS TECHNOLOGY

Twenty-five students entered the Medical Records Technology program in the Fall Term, 1974. Twenty-four (96%) were Miami-Dade Community College continuing students and one (4%) was a college transfer student. All twenty-five were females with eighteen (72%) graduating and seven (28%) withdrawing. The mean age of the group was thirty-one with the range being from twenty-five to sixty.

The following table is used to show the variable profile data of this group.

TABLE 9

Medical Records Technology Student Independent Variable Profile

N = 25 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School GPA	2.51	0.42	0.15	0.65	1.38	3.32
High School Natural Science Courses	1.53	0.26	0.12	0.51	1.00	2.00
High School English Grade	2.49	0.45	0.15	0.67	1.26	3.29
High School Grade in Natural Science	2.53	0.63	0.18	0.79	1.00	3.85
High School Grade in Mathematics	2.28	0.55	0.17	0.74	1.00	3.57
Percentile Rank in High School	61.47	745.15	6.26	27.30	7.00	90.00
MDCC GPA at time of Selection	2.86	0.88	0.19	0.94	1.00	4.00

The mean high school GPA of this particular group was 2.51, the average number of natural science courses taken was only, the average English grade 2.49. The groups' mean grade in natural science was 2.53, grade in mathematics was 2.28. This group graduated from high school on the average within the 61 percentile and it entered the Medical Records Technology program with an average grade point average 2.86.

To assess the above academic performance as valid predictors of grade point average, withdrawal or graduation from the program, the seven hypotheses were tested at the .05 probability level. All hypotheses rejected.

The following tables #10 and #11 are employed to show the results of the multiple regression correlations of the independent to the dependent variables. Table #12 is utilized to demonstrate the characteristics of the eighteen individuals who graduated from the Medical Records allied health program and Table #13 shows the information relating to the seven who withdrew.

TABLE 10

Medical Records Technology

Significance Rank Order of Independent Variables to GPA

N = 25 Independent Variables	F
High School English Grade	0.03
Number of High School Natural Science Courses	2.25
Grade Point Average at Selection	2.45
High School Grade Point Average	0.88
High School Grade in Natural Science	0.09
Percentile Rank in High School	0.07

Critical Value of F:4.41.

All independent variables proved to be insignificant at the .05 level in predictory final grade point average.

High School mathematics Grade not in the equation due to tolerance level insufficient for computation.

TABLE 11

Medical Records Technology

Significance Rank Order of Independent Variables to Graduation

N = 25 Independent Variables	F
Number of High School Natural Science Courses	0.50
Percentile Rank in High School	0.54
High School Grade in Natural Science	0.08
High School Grade Point Average	0.05

Critical Value of F:4.35.

All independent variables proved to be insignificant at the .05 level in predicting graduation.

High School English grade, High School Mathematics grade and MDCC Grade Point Average at time of selection not included in the equation because of tolerance level insufficient for computations.

TABLE 12

Medical Records Technology

Graduate Variable Profile

N = 18 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.50	0.47	0.17	0.68	1.38	3.32
Number of High School Natural Science Courses	1.50	0.27	0.13	0.52	1.00	2.00
High School English Grade	2.47	0.44	0.17	0.67	1.26	3.25
High School Grade in Natural Science	2.51	0.65	0.20	0.81	1.00	3.85
High School Grade in Mathematics	2.25	0.52	0.18	0.72	1.00	3.57
Percentile Rank in High School	61.81	812.03	7.12	28.50	10.00	93.00
MDCC GPA at time of Selection	2.86	0.59	0.18	0.77	2.00	4.00

The graduates of the Medical Records Technology group had an average high school grade point average of 2.50, the group enrolled in one natural science course, they earned a mean grade of 2.47 in English, 2.51 in Natural Science and 2.25 in mathematics, they graduated high school in the 61.81 percentile and had a 2.86 grade point average upon enrolling in the Medical Records program.

TABLE 13

Medical Records Technology

Withdrawal Student Variable Profile

N = 7 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.57	0.24	0.29	0.49	2.12	3.10
High School Natural Science Courses	2.67	1.33	0.67	1.16	2.00	4.00
High School English Grade	2.58	0.70	0.48	0.84	1.66	3.29
High School Grade in Natural Science	2.65	0.76	0.50	0.87	1.66	3.30
High School Grade in Mathematics	2.40	0.99	0.58	1.00	1.28	3.13
Percentile Rank in High School	59.67	610.33	14.26	24.71	37.00	86.00
MDCC GPA at time of Selection	2.88	1.83	0.51	1.35	1.00	4.00

The seven's average high school grade point average was 2.57, the group averaged two natural science courses while accomplishing a mean grade of 2.67 in natural science. The average English grade earned was 2.58, the math grade 2.40. The seven completed high school within the percentile 59.67 and entered the allied health program with a 2.87 Miami-Dade grade point average.

RADIOLOGIC TECHNOLOGY

Fifteen students entered the Radiologic Technology program in August, 1974. Eleven (73.3%) were continuing Miami-Dade Community College students and four (26.7%) were new college freshmen. Seven (46.7%) were male and eight (53.3%) were female. Thirteen (86.7%) graduated while two (13.3%) withdrew from the program. The mean age of the group was twenty-three with the range varying from a minimum of nineteen to a maximum of forty-three.

The following table #14 is utilized to illustrate the Radiologic Technology student variable profile.

TABLE 14

Radiologic Technology Student Independent Variable Profile

N = 15 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School GPA	2.48	0.29	0.14	0.54	1.58	3.38
High School Natural Science Courses	1.92	1.41	0.33	1.19	1.00	4.00
High School English Grade	2.61	0.43	0.17	0.65	1.25	3.50
High School Grade in Natural Science	2.37	0.31	0.16	0.56	1.33	3.50
High School Grade in Mathematics	2.21	0.42	0.17	0.65	1.00	3.60
Percentile Rank in High School	60.53	469.98	5.60	21.68	10.00	83.00
MDCC GPA at time of Selection	2.60	0.63	0.24	0.79	1.50	4.00

The average high school grade point average for this group was 2.48, the number of natural science courses taken 2 with a mean GPA earned of 2.37 within natural science. The group's average English grade was 2.61, its mathematics grade 2.21. The majority of the group graduated high school within the 60.53 percentile and the group had a mean MDCC grade point average of 2.60 upon entrance into the Radiologic program.

The seven hypotheses tested all were rejected at the .05 probability level.

Tables #15 and #16 are used to show the correlation between the independent and dependent variables of this project.

Table #17 is employed to illustrate the characteristics of the thirteen students who graduated and Table #18 shows withdrawal student information.

TABLE 15

Radiologic Technology

Significance Rank Order of Independent Variables to GPA

N = 15 Independent Variables	F
High School Grade in Natural Science	0.03
High School Grade Point Average	0.33
MDCC Grade Point Average at Selection	0.34
High School English Grade	0.02
Number of High School Natural Science Courses	0.28
High School Mathematics Grade	0.30
Percentile Rank in High School	0.17

Critical Value of F:5.59.

All seven independent variables were insignificant at the .05 level in predicting final grade point average.

TABLE 16

RADIOLOGIC TECHNOLOGY

Significance Rank Order of Independent Variables to Graduation

N = 15 Independent Variables	F
High School Grade Point Average	1.58
MDCC Grade Point Average at Selection	3.55
Number of High School Natural Science Courses	0.30
High School Mathematics Grade	1.04
Percentile Rank in High School	0.98
High School English Grade	0.62

Critical Value of F:5.32.

All independent variables proved to be insignificant at the .05 level in predicting graduation from the Radiologic Technology program.

High School Grade in Natural Science not included in the predictor equation because of insufficient tolerance for calculations.

TABLE 17

RADIOLOGIC TECHNOLOGY

Graduate Variable Profile

N = 13 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	2.55	0.27	0.14	0.52	1.67	3.38
Number of High School Natural Science Courses	2.00	1.60	0.38	1.27	1.00	4.00
High School English Grade	2.67	0.43	0.18	0.65	1.25	3.50
High School Grade in Natural Science	2.44	0.26	0.15	0.51	1.83	3.50
High School Grade in Mathematics	2.26	0.47	0.19	0.69	1.00	3.60
Percentile Rank in High School	62.92	464.41	5.98	21.55	17.00	90.00
MDCC GPA at time of Selection	2.44	0.51	0.24	0.71	1.50	3.57

The Radiologic Technology graduates had a 2.55 average high school grade point average, they enrolled in an average of two natural science courses, they had grades of 2.67, 2.44 and 2.27 respectively, in English, Natural Science and Mathematics. They graduated high school in the 62.92 percentile rank and entered the allied health program with an average GPA of 2.44.

TABLE 18

RADIOLOGIC TECHNOLOGY

Withdrawal Student Variable Profile

N = 2 Independent Variables	Mean	Variance	Standard Error	Standard Deviation	Range Minimum	Range Maximum
High School Grade Point Average	1.99	0.34	0.41	0.58	1.58	2.40
High School Natural Science Courses	1.50	0.50	0.50	0.71	1.00	2.00
High School English Grade	2.18	0.43	0.47	0.66	1.71	2.64
High School Grade in Natural Science	1.96	0.78	0.63	0.88	1.33	2.58
High School Grade in Mathematics	1.89	0.02	0.11	0.16	1.78	2.00
Percentile Rank in High School	45.00	450.00	15.00	21.21	30.00	60.00
MDCC GPA at time of Selection	3.34	0.88	0.67	0.94	2.67	4.00

The two students who withdrew from the Radiologic Technology program were male and female with an average age of twenty-two. The two had an average high school grade point average of 1.99, both had taken one course in natural science, their average English grade was 2.18. The natural science grade mean was 1.96, the average mathematics grade 1.89; they had an average GPA of 3.34 upon entrance into the program and they completed high school in the 45 percentile on the average.

SUMMARY

The hypotheses of this research study were concerned with assessing students' academic performance in high school and college as valid predictors of final grade point average, withdrawal or graduation from four allied health programs. The four programs were Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology. All four curricula were located at the Miami-Dade Community College Medical Center Campus in Miami, Florida.

Within the four programs, the seven hypotheses were rejected in all instances except the following:

The Miami-Dade Community College Grade Point Average at time of selection proved significant at the .05 level for predicting the Dental Hygiene student's final college grade point average.

High School Grade earned in Natural Sciences proved to be significant at the .05 level in predicting graduation from the Medical Laboratory Technology program.

High School English grade earned also proved to be significant at the .05 level in predicting graduation from the Medical Laboratory Technology program.

For a summary profile of the results of the four allied health programs, see Table 19, Appendix A.

CHAPTER 5

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

DISCUSSION

The Medical Center Campus of Miami-Dade Community College, Miami, Florida is a limited access, speciality campus that utilizes criterion measures to select future allied health practitioners. The predictors that are employed are the seven independent variables studied by this project, personal interviews, letters of recommendations and test scores on the School and College Ability Test (SCAT). These measures are used because of high enrollment demands, limited instructional spaces and the high costs of allied health programs.

The purpose of this project was to evaluate the selection predictors of four allied health programs of the Medical Center Campus (Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology). Seven predictors (independent variables) were correlated with three dependent variables and data were analyzed for each of the programs. The students studied were the ninety-one entering classmen of the Fall 1974 term.

Eighty-two students, or 90% of the population studied, were campus transfer students within the college. This factor eliminates those who during their first year of college tend to withdraw. The campus transfer student usually has completed more than thirty hours of college semester credits and has proven his/her capability of completing college level course work. Although this project

proved only three independent variables to be significant at the .05 probability level, the overall results of the number graduates from the four programs substantiates that the present selection systems are successful. This success is partially due to the highly motivated and mature college transfer student.

Information for this project was collected from each of the student's individual permanent record files and stepwise correlations and predictor equations were used to determine validity. The results of the analysis of the hypotheses are employed in this chapter to answer the research questions listed in Chapter One. The answers are then used to formulate conclusions and recommendations for the Campus Vice President and Campus Dean's Council. The Vice President, the Dean's Council, the faculty, staff and students are quite conscious of the importance of a valid selection filtering system in choosing the allied health professionals of the future.

> Question 1: What is the relationships between a high school grade point average and grade point average, withdrawal and graduation from the Medical Center Campus Allied Health programs?

As a result of the examination of high school grade point averages as predictors of final grade point average withdrawal and graduation at the .05 probability level, it can be concluded that for the Medical Center Campus allied health programs (Dental Hygiene, Medical Laboratory Technology, Medical Records Technology and Radiologic Technology) that this particular variable was not significant. This conclusion agrees with Rice (1968) who found that a student's high school composite grade point average has less relevance for predicting academic success than a students' performance in specific subject areas. The conclusion, however, does not agree with the 1971 report from the Department of Health, Education and Welfare

Office which supported high school grade point averages as the best overall predictor of college grades for both minority and white freshmen. The results are also in disagreement with Hopper (1968) who found that out of thirty-one variables, the student's overall high school grade point average was a valid predictor of first semester college grades.

The average high school grade point averages for this study were 2.64 for Medical Laboratory Technology graduates and 2.35 for those who withdrew from the program. The Medical Record student graduates earned a 2.50 which was lower than the 2.57 for those who did not complete the program. The Radiologic Technology students who completed the program had earned a high school grade point average of 2.53 while the non-graduates earned a 1.99. The differences of the grades between the student groups (graduates and withdrawals) within the program were minimal (see Appendix A). This minimum variance decreases the probability of a positive correlation.

> Question 2: What is the relationships between the number of high school natural science courses taken and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

The results of this project indicated that the variable, number of high school natural science courses taken, was insignificant at the .05 probability level in predicting grade point average, withdrawal and graduation from the four allied health programs of the Medical Center Campus. Ballinger in 1976 found the same conclusions in his study, which indicated low correlations of the number of natural science courses taken in predicting students passing a Registry Examination for Radiologic Technology. His findings agree with the results of this project.

Question 3: What is the relationship between the high school English grade and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

The high school English grades earned proved to be significant at the .05 probability level in predicting graduation from the Medical Laboratory Technology Program (MLT). The average English grade for the graduate of the MLT program was 2.71 and for the non-graduate, 2.74. The dropouts had a higher English grade point average, but the multiple regression analysis proved the Medical Laboratory Technologists' English grade to be a valid predictor of graduation.

These results agree with Rice who in 1968 concluded from his study that high school English grade has a high correlation coefficient for predicting academic success. Hopper (1968) also found that a student's high school grade for a specific subject area was a valid predictor of first semester college grades. Ballinger (1976) found success in his study in correlating English high school grades for predicting Radiologic Technology students pass a Registry Examination. The graduates within the Radiologic program of this study had an average English grade point average of 2.67 as compared to the non-graduates with a mean grade of 2.18 for high school English.

Question 4: What is the relationship between the high school grades in natural science and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

The high school grade earned in natural science proved to be significant at the .05 level in predicting graduation from the Medical Laboratory Technology program. The grade earned for the graduates of Medical Laboratory Technology was 2.99 and

2.79 for the non-graduates. The natural science high school grade for the MLT graduates was the highest earned among the four programs. Dental Hygiene graduates had a natural science grade of 2.85, Medical Records graduates, 2.51 and Radiologic Technologists, 2.43. The highest grade earned proved to have the most significance in predicting graduation.

Question 5: What is the relationships between high school grade in mathematics and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

The average mathematics grade earned in high school differed among the four program graduates were as follows: Dental Hygiene, 2.73; Medical Laboratory Technology, 2.60; Medical Records, 2.25 and Radiologic Technology, 2.26. However, the results of this study concluded that high school grade in mathematics was not significant at the .05 probaoility level in predicting the three dependent variables. The results showed no evidence of validity in using this variable as an indicator of successful completion of any of the four allied health programs.

Question 6: What is the relationships between the graduating percentile rank in high school and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

Although Ballinger in 1976 concluded that his most significant predictor was the high school percentile rank in predicting success, this recent project showed no evidence of significance in the use of high school percentile rank as a predictor variable. The results of this study showed the Dental Hygiene graduates to be in the 72.6 percentile, the MLT students in the 66.3, the MRT students in the 61.8 and the Radiologic group in the 62.9.

The students who withdrew from the four programs finished respectively in the 63.3 percentile (MLT), the 59.6 percentile (MRT) and the 45th percentile (Radiologic). The one Dental Hygiene withdrawal had incomplete records. The statistics show evidence of possible predictability, but the predictor equations did not prove significance at the .05 level.

Question 7: What is the relationship between Miami-Dade Community College grade point average prior to selection and grade point average, withdrawal and graduation from the Medical Center Campus allied health programs?

The Miami-Dade Community College grade point average at time of selection proved significant at the .05 level for predicting Dental Hygiene students' final college grade point average. The summary table of this project (Appendix A) shows the Dental Hygiene group to have the highest Miami-Dade Community College grade point average at time of selection, 3.18. The Dental Hygiene group also graduated with the highest final college grade point average, 3.45.

CONCLUSIONS

The basic assumption of this research study was that the seven independent variables currently being utilized as admissions selection criteria at the Miami-Dade Community College Medical Center Campus were valid predictors of grade point average, withdrawal and graduation from four allied health programs. The results of this project proved that three variables were significant in three instances. In all the other situations tested, the results proved to be insignificant. The cases which proved to have positive correlations were:

The Miami-Dade Community College Grade Point average at time of selection for predicting Dental Hygiene students' final college grade point average.

High School Grades earned in the Natural Sciences were significant in predicting graduation from the Medical Laboratory Technology program.

High School English grades earned in high school proved to be significant in predicting graduation from the Medical Laboratory Technology program.

It is important to note that the small "N" tested in each of the four allied health programs might have distorted the findings. However, the findings do support the need to review additional variables such as age and sex, as predictors of grade point average, graduation and withdrawal. An interesting finding which denotes future investigations is that the non-graduates of the Medical Records program had earned a higher grade in most instances than the graduates of the program. This raises questions in the area of student personal reasons for withdrawing.

RECOMMENDATIONS

The findings of this research project were presented to the Campus Vice President and the Dean's Instructional Council for discussion and recommendations. The Medical Center Campus administration agreed that the findings support the recommendation that the three positive variable correlations be used as valid predictors for selecting final college grade point average and graduation as was indicated. The three significant variables could be used to supplement the current selection filtering system of personal interviews and test scores results. The high school grades in natural science and the high school grades earned in English proved to be valid indicators of graduation of applicants for Medical Laboratory Technology and the Miami-Dade Community College grade point average at time of selection proved significance in predicting Dental Hygienists' final college grade point average. These results are valuable for assisting Campus admissions committees in the selection of allied health students from the over supply of applicants.

Additional recommendations from the results of this project support the need for additional research studies because in the majority of the cases tested the results were insignificant:

1. Additional research be conducted to determine the validity of personal interviews as they are incorporated into admissions processes.

2. Additional studies be accomplished to study comparisions of groups of campus transfer students selected and high school graduates selected

(new college freshmen) for enrollment into an allied health program.

3. Additional research be undertaken to review other independent variables for predicting final grade point average, graduation or withdrawal from the Medical Center Campus limited access allied health programs.

4. Additional studies be accomplished to review specific reasons for individual students withdrawing from the allied health programs.

5. Additional projects should be undertaken to review the same seven independent variables for the four allied health programs for the freshmen class of Fall, 1975 and Fall, 1976.

The personnel of the Miami-Dade Community College Medical Center Campus are quite conscious of the importance of valid decision making processes in the admissions of students to allied health professions. Growing members of applicants with heightened awareness of their legal rights are forcing a greater precision in defining criterion measures for selection admissions systems (Chaisson, 1976). The review of predictors of successful completion of allied health programs was an important project for the future of the allied health students. Faced each year with a deluge of applicants, the search for equitable and feasible admissions processes continues. In final analysis, there may be no fail-safe plan for selecting the most worthy candidate, but knowledge can be derived from this kind of research and others that are conducted.

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APPENDIX A

TABLE 19

Summary Variable Profile Table

	Dental Hygiene			Medical Laboratory Technology		
Variables	Group	Graduates	Withdrawals	Group	Graduates	Withdrawals
High School Grade Point Average	3.02	3.02	----	2.55	2.64	2.35
Number of High School Natural Science Courses	2.22	2.22	----	2.50	2.44	2.43
High School English Grade	3.14	3.14	----	2.82	2.71	2.75
High School Grade in Natural Science	2.85	2.85	----	2.77	2.99	2.79
High School Grade in Mathematics	2.73	2.73	----	2.36	2.60	2.15
Percentile Rank in High School	72.60	72.60	----	66.24	66.33	63.33
MDCC GPA at time of Selection	3.18	3.18	3.00	2.62	2.76	2.99
MDCC GPA at Graduation or Withdrawal	-----	3.44	2.93	-----	3.00	2.36

APPENDIX A (CONT.)

TABLE 19

Summary Variable Profile Table

Variables	Medical Records Technology			Radiologic Technology		
	Group	Graduation	Withdrawal	Group	Graduation	Withdrawal
High School Grade Point Average	2.51	2.50	2.57	2.48	2.53	1.99
Number of High School Natural Science Courses	1.53	1.50	2.67	1.92	2.00	1.50
High School English Grade	2.49	2.47	2.59	2.61	2.67	2.18
High School Grade in Natural Science	2.53	2.51	2.65	2.37	2.44	1.96
High School Grade in Mathematics	2.28	2.26	2.40	2.21	2.26	1.89
Percentile Rank in High School	61.47	61.81	59.07	60.53	62.90	45.00
MDCC GPA at time of Selection	2.86	2.86	2.88	2.60	2.44	3.34
MDCC GPA at Graduation or Withdrawal	-----	2.97	2.89	-----	3.11	2.96

VITA

Alan Martin Bistreich was born June 29, 1945 in New York City, New York. At age five, he and his family moved to Staten Island, New York where he resided until July, 1968. Alan graduated P.S. 29 in June, 1959 and entered Curtis High School the following fall. Four years later, June 1963, he graduated Curtis High with honors. He began his undergraduate studies at City College of New York, Bernard Baruch School of Business and Public Administration, majoring in accounting. June 1967 he obtained his Bachelor of Business Administration with a major in Marketing and Advertising. For a year he was employed as an account executive for Melton Advertising, Inc., New York, New York.

July 1968 he entered the United States Army Military Intelligence Branch, Army Security Agency. He was commissioned a Second Lieutenant in May, 1969, and a Captain two years later.

Upon honorable discharge in February 1972, Alan began his occupational career at Miami-Dade Community College as a Systems Planning Specialist for District Administration. He also began pursuing his Masters degree at Florida International University at night. January 1973, Mr. Bistreich was transfered to the North Campus to fill the vacant position of Admissions Officer. He was employed in that position for almost two years and then he was promoted to Director of Student Organization and Services Management, Medical Center Campus.

Prior to his promotion, he graduated Florida International University with a Master

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